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ORIGINAL EMPIRICAL RESEARCH

Effects of sampling healthy versus unhealthy foods on subsequent food purchases

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Abstract

Food sampling at retail stores and restaurants (e.g., amuse bouche) is a widespread practice. These food samples vary considerably in healthfulness levels. Prior research has primarily focused on the effects of sampling on evaluations and sales of the sampled item. However, can there be unintended consequences of sampling a healthy versus an unhealthy item on subsequent purchases of *other* food items? Also, would the degree of dissimilarity between the sampled item and subsequent options moderate the effects? The results from a series of experiments, including four studies conducted in field settings, show that sampling a healthy (vs. unhealthy) item paradoxically leads to greater subsequent purchase/choice of unhealthy foods – but only when consumers perceive a relatively high level of dissimilarity between the sampled item and subsequent options. This effect reverses when the sampled food and subsequent options are perceived as being relatively low on dissimilarity (i.e., high on similarity).

Keywords Retail sampling · Healthy and unhealthy foods · Product choice · Dissimilarity · Field studies

Food sampling at retail stores and restaurants has been a widespread practice (Wohl, 2021). The food and beverage industry has been spending over a billion dollars annually on complimentary food samples for several years (Biswas et al., 2014). For example, offering amuse bouche (a complimentary, small appetizer sample offered before a meal) is a widespread practice at many restaurants in Europe and in many other parts of the world. Similarly, retail stores like Costco and Trader Joe's regularly offer complimentary food samples. Web Appendix 1 outlines marketplace examples of complimentary food samples.

The food samples handed out vary considerably in terms of their healthfulness level. In this research, we examine how sampling healthy versus unhealthy foods might influence subsequent food purchases in terms of healthfulness levels and caloric content. As an illustrative example, suppose at a retail store or a restaurant, a customer is offered a sample of a bite-sized food item as they enter the store (see Web Appendix 1). Would the healthfulness level of the sampled food item influence this customer's subsequent purchases of other food items? In other words, would initial sampling of a healthy versus an unhealthy food item influence the type and quantity of food subsequently purchased? Furthermore, would the pattern of effect be moderated by the degree of perceived dissimilarity between the sampled food item and subsequent options? In this research, we attempt to provide answers to these questions.

Prior studies on food and non-food sampling have primarily examined the effects of sampling a particular product on the subsequent choice of that *focal product* (e.g., Biswas et al., 2010, 2014; Nowlis & Shiv, 2005; Shiv & Nowlis, 2004). While these studies have examined how sampling a

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food item affects evaluation and subsequent choices for the sampled items, we argue there can be unintended spillover effects of sampling a food item on sales of *other* food items, a largely unexplored issue.

Prior studies have examined the reward-seeking effects of sampling (Wadhwa et al., 2008). Research studies have also examined several factors that influence choices between healthy and unhealthy options (Biswas & Szocs, 2019; Biswas et al., 2019; Redden & Haws, 2013), anchoring effects of sequential evaluation of vices and virtues (Chernev, 2011a) and joint evaluation of virtue and vice foods (Chernev & Gal, 2010). However, to the best of our knowledge, no research has examined the effects of sampling healthy versus unhealthy food items on subsequent choices of *other* food items. In that regard, we take an important step in examining how the healthfulness level of a sampled food item might influence subsequent healthy/unhealthy food choices. We also examine the effects on total calories purchased. Equally importantly, we investigate how perceived dissimilarity between the sampled food and subsequent options can moderate the effects.

It should be noted that our research differs from prior studies that have examined how consumers balance healthy and unhealthy meals (Chandon & Wansink, 2007; Dhar & Simonson, 1999). These studies show that perceived unhealthy meals are balanced by selecting healthier side dishes or drinks, and guilt is often the underlying factor behind this behavior (Chandon & Wansink, 2007; Chernev, 2011b; Okada, 2005). In contrast, in this research, we do not examine the effects of full meals or choosing multiple items simultaneously – instead, we focus on the effects of bite-sized sampling on subsequent choices. The focus on bite-sized sampling is of practical relevance given the widespread popularity of sampling practices at retail stores and restaurants, as highlighted earlier.

Our research differs from the work by Finkelstein and Fishbach (2010) and Wilcox et al. (2009) on presence or framing of healthy foods. Specifically, Wilcox et al. (2009) found that the presence (vs. absence) of a healthy item in a choice set leads to indulgent food choices; the mere presence of a healthy item temporarily fulfills a health goal and leads to a license to indulge. In addition, Finkelstein and Fishbach (2010) observed that consumers sampling an item framed as healthy (vs. tasty) reported being hungrier and consuming more food. This is in line with findings that healthy foods are perceived as less filling (Suher et al., 2016). In contrast, in our studies, participants sampled different food items that were either healthy or unhealthy, and the key dependent variable was subsequent food choice. We also address the healthy = less filling perception in one of our studies (i.e., Study 2). Table 1 highlights the key differences between the present research and relevant prior work in related areas.

Our research aligns more with prior work in two separate domains—studies related to moral licensing (Blanken et al., 2015) and priming effects (Harris et al., 2009). Interestingly, these two theoretical domains would predict opposite patterns of outcomes for sampling of healthy (vs. unhealthy) foods on subsequent choices. While priming effects would predict a higher preference for subsequent healthy options after sampling a healthy item, moral licensing would predict a higher preference for unhealthy foods. We demonstrate how the degree of perceived dissimilarity between the sampled and subsequent food options tilts the outcomes in favor of moral licensing versus priming effects. This is an unexplored domain and contributes to both the priming and moral licensing literature streams. We elaborate on this in the theoretical background section.

Theoretical background

When consumers make choices between healthy and unhealthy food options, they often face tradeoffs between long-term gains and short-term pleasure (Dhar & Wertenbroch, 2000; Romero & Biswas, 2016). However, in the context studied in this research, consumers do not have to make the initial choice about the type of food sampled; instead, the food sample (healthy vs. unhealthy) is provided by the retailer, and hence the choice for a healthy versus unhealthy option is made by the firm. We first elaborate on how initial physical sampling of healthy versus unhealthy foods can affect subsequent food choices through feeling virtuous (i.e., moral licensing) or through a priming mechanism. Then, we examine the moderating effect of perceived dissimilarity between the sampled food and subsequent options.

Moral licensing effects

Eating a healthy food item (even if bite-sized) is considered virtuous (Romero & Biswas, 2016). Reports from the popular press suggest that people tend to feel good after undertaking a virtuous activity, such as after consuming foods that they think are healthy or fresh (McArdle, 2016). Social norms and pressures further enhance the "feel-good" factor of virtuous eating (Conrad, 1994). In other words, an action or decision that leads to good outcomes enhances peoples' perceptions of what they are doing is of value (Higgins, 2000). Also, people tend to systematically underestimate the calorie content of healthy foods (Carels et al., 2006). That is, traditionally healthy foods are perceived as healthier than they really are, which magnifies the "feel-virtuous" factor of sampling even a bite-sized healthy food. Even accepting a complimentary bite-sized healthy food should make the consumer feel they have undertaken a virtuous activity.

When people feel virtuous, they are more likely to undertake self-rewarding indulgence, which is a way of rewarding the self for a good deed (Mick & DeMoss, 1990). Studies across

Table 1 Distinction of present research from prior research studies

Context	Paper	Related Findings	Sampling Context	Role of Dissimilarity	Differentiation
Work predicting meal balancing effects	Chandon and Wansink (2007)	Unhealthy meals balanced with healthier side items due to health halo	No sampling	Not examined	We focus on bite-sized samples, not full meals, and observes effects primarily driven by healthy sampling
	Chernev (2011b)	Adding a healthy item to a dish lowers perceived calories	No sampling	Not examined	We introduce actual sampling as a precursor to subsequent choices, with perceived dissimilarity as a moderating factor
	Okada (2005)	Hedonic choices are preferred unless utilitarian options are presented jointly	Choice presentation context: No sampling	Not examined	
	Chernev and Gal (2010)	Consumers underestimate calorie content when assessing healthy/unhealthy food combinations	Joint evaluation of food items: No sampling	Not examined	
	Chernev (2011a)	Healthy items first lead to a higher calorie estimates for subsequent indulgent items	No actual sampling	Not directly examined, relates to sequential evaluation	
	Liu et al. (2015)	Consumers favor vice-virtue food bundles with less vice, rating them as healthy as larger vice bundles	No sampling	Not examined	
Work predicting indulgent consumption leads to indulgent choices	Geyskens et al. (2008)	Real food present suppresses subsequent eating goals, while non-actionable opportunities like ads can activate, eating goals	Actionable food sampling	Not examined	Our findings indicate that after sampling healthy foods, people are more likely to choose unhealthy options later (when there is perceived dissimilarity) Beyond indulgent foods, we compare sampling of healthy versus unhealthy items with a broader consumer base beyond dieters or restrained eaters We focus on perceived dissimilarity as a key moderator, rather than internal goal dynamics
	Herman and Mack (1975)	Restrained eaters given milkshakes subsequently disengage from their goal and overindulge	Sampling for taste perception	Not examined	

Table 1 (continued)

Context	Paper	Related Findings	Sampling Context	Role of Dissimilarity	Differentiation
	Wadhwa et al. (2008)	Tasting an indulgent sample prompts the choice of similar rewards	Sampling indulgence	Not examined	
	Laran and Janiszewski (2009)	Sampling unhealthy food can either reinforce indulgent behavior if it is seen as part of an indulgence goal or lead to healthier choices if perceived as goal fulfillment	Sampling indulgence	Not examined	
Work predicting that healthy food perceptions lead to indulgent consumption	Wilcox et al. (2009)	The presence (vs. absence) of a healthy item in a choice set leads to indulgent food choices	No sampling	Not examined	We investigate the impact of actual sampling. Also, our study highlights how perceived dissimilarity between samples and choices affects subsequent choice
	Finkelstein and Fishbach (2010)	Healthy samples (framed as healthy) reported to increase hunger and food intake	Food sampling (framing healthy vs. unhealthy)	Not examined	We show no significant impact of sampling on hunger in a field setting, without health framing. Our participants sampled healthy or unhealthy items without receiving health frames. Extends by examining dissimilarity as a moderator rather than just health framing
	Suher et al. (2016)	Sampling a healthy-framed item increases hunger because it is perceived as less filling	No sampling	Not examined	

different topic domains have shown that an initial virtuous act leads to subsequent self-rewarding indulgence. For example, Mukhopadhyay and Johar (2009) demonstrated that when consumers show restraints for impulse purchases in time period T1, they provide justification for indulgence in time period T2 and also make an indulgent choice in T2. Similarly, Perry et al. (1985) have shown that when children feel happy or good, they have a greater tendency to self-indulge. More recently, Krishna and Hagen (2019) found that holding the amount of food consumption equal, larger versus smaller food leftovers lead to reduced perceived consumption, which leads people to feel better about themselves, which in turn causes them to eat more in a subsequent unrelated food consumption task.

In essence, most people tend to justify activities as being virtuous to feel good (Annas, 2004), and this perceived act of virtuosity enhances self-rewarding indulgence (Krishna & Hagen, 2019; Mukhopadhyay & Johar, 2009). Accordingly, we propose that sampling even a bite-sized healthy food enhances feelings of virtuousness, leading to self-rewarding indulgence and indulgent purchases. Such a pattern of effects parallels a moral licensing account.

Moral licensing refers to the effect of initial moral behavior providing the "license" to subsequently undertake immoral behavior (Blanken et al., 2015; Khan & Dhar, 2006). Studies in the domain of moral licensing have demonstrated that when an individual opts for an alternative that is considered moral, they feel they have earned the license to subsequently indulge (Effron & Conway, 2015; Merritt et al., 2010; Monin & Miller, 2001).

While in prior studies on moral licensing, the individual made the moral choice to earn the license, our study contexts are different. In our setup, the item choice was made for the consumer (e.g., by the retailer, restaurant, or researcher). However, it is also worth noting that, from the consumers' perspective, they are aware that they can refuse to sample a food item even if they do not actively choose the type of item. So, the active task of eating a healthy sample (without declining that opportunity) can induce a sense of right to subsequently indulge. This is a major differentiation from most prior research on moral licensing; we propose that an active choice between virtuous and non-virtuous options is not necessary for inducing feeling virtuous. We argue that even when a virtuous choice is made for a consumer, they feel they have earned the right to feel virtuous, which gives them a license to subsequently indulge. In sum, sampling a healthy food item demonstrates a virtuous act, which in turn provides the consumer the perceived virtuousness to indulge subsequently.

It should be noted that research in meal balancing (Dhar & Simonson, 1999) and variety-seeking behavior (Ratner & Kahn, 2002) would predict similar outcomes for the healthy food sampling. That is, sampling a healthy item initially would lead to a higher likelihood of choosing an unhealthy item to balance out (and/or induce variety for) the two different food consumption episodes. One difference between moral licensing and balancing (or variety seeking) is that the former account does not make a prediction for unhealthy food sampling on subsequent behavior, while the latter theoretical accounts do. However, work on moral cleansing (Kim et al., 2018; Ramanathan & Williams, 2007) would predict subsequent higher choice of healthier foods after sampling an unhealthy food. The results of Study 2 provide empirical evidence in favor of moral licensing over predictions by theories related to balancing (Dhar & Simonson, 1999) and variety seeking (Ratner & Kahn, 2002) when there is perceived dissimilarity between the sampled and subsequent items. Next, we discuss the potential role of priming effects.

Priming effects

Priming effects refer to the facilitative effects of an encounter with a stimulus on the subsequent processing of a similar stimulus or related stimuli (Bargh et al., 2001; Fitzsimons et al., 2008). Research shows that priming a variable enhances the likelihood that it will be used to process subsequent stimuli (Higgins et al., 1985). For instance, Harris et al. (2009) reported that participants exposed to commercials of unhealthy snacks (e.g., candy bar, cola soft drink) versus healthy snacks (e.g., granola bar, oatmeal) consumed a significantly higher amount of food in a mindless eating context. Laran and Janiszewski (2009) found that sampling indulgent foods may prompt further indulgent choices if it stimulates an indulgence goal. Conversely, if such sampling is viewed as fulfilling an indulgence goal, subsequent healthier choices may follow (the opposite behavior may be expected). In the context of the current research, priming effects would predict that sampling a healthy (vs. an unhealthy) item would trigger priming or momentum towards a greater likelihood of subsequent choice of other healthy (vs. unhealthy) options.

Another account that would predict outcomes similar to a priming effect in the unhealthy food sampling is the "what the hell" (WTH) effect, which posits that consumers who break their diet by eating a small, unhealthy item would subsequently overeat (Yum Sin & Vartanian, 2012). In line with this reasoning, a consumer eating a small unhealthy sample may subsequently choose more unhealthy foods. One key distinction is that priming effects influence outcomes from both healthy and unhealthy samples, whereas the WTH effect is associated with an indulgent activity (i.e., sampling of an unhealthy food) only. Importantly, and different from our work, the WTH effect has been shown to be relevant for restrained eaters, with non-restrained eaters being less susceptible to WTH-related overeating (Polivy & Herman, 2020).

Would feeling virtuous from eating a healthy food sample prime more virtuous activities, or would this lead to moral licensing and subsequent indulging? We propose that the answer to this question is influenced by the degree of

dissimilarity perceived between the initial sampled item and the subsequent options. Next, we discuss how perceived dissimilarity between the sampled item and subsequent options can change the direction of effects in favor of moral licensing vis-à-vis priming effects.

Effects of perceived dissimilarity between initial sample and subsequent options

Consumer judgments are not made in isolation, and contextual factors and order effects influence judgment processes (Biswas et al., 2014). In the context of our research, the initial food sampling and the subsequent choice involve two different tasks. We propose that moral licensing effects would hold when participants see the two activities as separate episodes; that is, the initially sampled item and subsequent options are perceived as dissimilar. In contrast, priming effects are likely to occur if they perceive the sampled item and subsequent options as being similar. Similarity perceptions play a major role in consumer decision making (Biswas et al., 2014; Dhar et al., 1999; Kim et al., 2013). Specifically, when sequential task options are perceived as being relatively similar, there can be continuity effects in the choice (Webb & Shu, 2018), leading to priming-consistent outcomes.

In sum, based on the above arguments, we propose that when the initially sampled food and the subsequent options are perceived to be dissimilar, sampling a healthy (vs. unhealthy) item would lead to higher subsequent preference for the unhealthy options. This effect will attenuate and reverse when consumers perceive the sampled item and subsequent options to be relatively similar. Formally stated:

H1 When consumers perceive high dissimilarity between a sampled item and subsequent options, sampling a healthy (vs. unhealthy) food leads to a subsequent higher choice likelihood of unhealthy food options.

H2 The effect predicted by H1 holds when consumers perceive high dissimilarity between the sampled item and subsequent options with the effect attenuating and reversing when consumers perceive high similarity between the sampled item and subsequent options.

Overview of studies

We test our hypotheses with the help of eight experiments, with four of them conducted in the field. Six of these are reported in the main text and two additional studies are provided in the Web Appendix. First, Study 1a, conducted in a field setting (restaurant), tests the main effects of sampling healthy versus unhealthy foods on subsequent hypothetical food ordering. Study 1b demonstrates these findings in a different type of field setting (food store) with actual food purchases. Study 2, conducted in a lab setting, includes the control condition with no food sampling.

Studies 3a – 3c investigate how the level of perceived dissimilarity moderates the impact of sampling. These studies show that higher perceived dissimilarity leads to outcomes aligned with moral licensing, whereas lower perceived dissimilarity (i.e., higher perceived similarity) results in outcomes consistent with the priming effect account. Studies 3a and 3b show the effect of actual food sampling and a consequential food choice, while Study 3c involved actual food sampling and hypothetical choices. The studies reported in Web Appendices 3 and 4 replicate the key findings of Studies 2 and 3a – 3c in field settings. Table 2 provides an overview of the main findings from each study. All the items used as samples and the choice outcomes were pretested and detailed in Web Appendix 2, which also includes additional information regarding the healthfulness and (dis)similarity of all the items sampled and chosen.

Study 1a: Sampling at a restaurant

Method

Study 1a, a preregistered experiment (https://aspredicted.org/s2an7.pdf) tested H1 in a field setting (restaurant). This restaurant is independently owned (i.e., non-chain), at the mid-price level, has Mexican cuisine, and is in a major city in the USA.

The study was conducted in collaboration with the restaurant management. The experiment had two between-subjects manipulated conditions (sampling a healthy food vs. sampling an unhealthy food). With help from the wait staff, a research assistant collected the data for the study. As preregistered, the study was conducted over four days across two weekends between approximately noon and 8:00 P.M. The day of the week was counterbalanced across the two experimental conditions.

The researcher approached restaurant customers and asked whether they might be willing to sample a complimentary food item and fill out a brief paper survey. Almost everyone approached agreed to try out the sample and take the survey. The restaurant customers (N = 162) were randomly given either a healthy sample (coin-cut carrot with tomato salsa added; n = 83) or an unhealthy sample (bite-sized brownie piece; n = 79). As a cover story, customers receiving the sampling item were told that it was with compliments from the restaurant. They were also told that the restaurant is planning to add additional items to its menu and is seeking feedback on the food sample.

After sampling the item, customers received a survey that asked them two questions about the sampled item: "How would you rate the taste of the sampled food?" (1 = very bad, 7 = very good) and "How unhealthy/healthy is the food that

Table 2 Overview of studies in main text

Study	Type of study	Sampled items	Analyzed product choices	Key findings
1A	Field experiment	Coin cut carrot with salsa vs. brownie	Hypothetical menu choice (coded into healthy and unhealthy) out of 4 options	With dissimilar set of sampled and subsequent options, sampling a healthy (vs. an unhealthy) food leads to higher preference for indulgent foods
1B	Field experiment	Apple slice vs. cake piece	Real foods (German farmers' market), calorie content	Sampling a healthy (vs. an unhealthy) food leads to higher total calorie purchase
2	Lab experiment	Dried fruit vs. chocolate piece vs. nothing (control)	Hypothetical choice (salad vs. grilled cheese sandwich)	Replication of Study 1a with the effects driven primarily by the healthy sample with the unhealthy sample and control conditions leading to similar choice outcomes
3A	Lab experiment	Freeze-dried strawberries vs. Rolo chocolate	Consequential choice: granola bar vs. cookie-caramel bar	Moderating effects of perceived dissimilarity demonstrated. When the sampled and subsequent options are perceived as high (low) on dissimilarity, sampling a healthy (vs. unhealthy) food leads to higher preference for unhealthy (healthy) foods
3B	Lab experiment	Freeze-dried strawberries vs. Rolo chocolate	Consequential choice: granola bar vs. cookie-caramel bar	Replicated the findings of Study 3a
3C	Lab experiment	Freeze-dried strawberries vs. Rolo chocolate	Hypothetical choice: Blueberry Granola Bar vs. Chocolate Chip Cookie	Replicated the findings of Studies 3a and 3b with a different set of food options

you just sampled?" (1 = very unhealthy, 7 = very healthy). They also indicated their age ($M = 33.04$) and gender (42% females, 56.8% males, 1.2% others). After this, the customers received a paper menu on which they indicated all the items they would like to order in a hypothetical choice context. Participants were asked to hypothetically choose one of the four options: a grilled chicken taco (coded healthy), a fried chicken taco (coded unhealthy), a cauliflower taco (vegetarian, coded healthy), and a quesadilla (vegetarian, coded unhealthy); see Web Appendix 2 for the details. The sampled foods and subsequent options were perceived to be significantly dissimilar (see Web Appendix 2).

Results and discussion

Since the initially sampled item and subsequent options were perceived as being dissimilar, we expect H1 to hold, whereby sampling a healthy (vs. unhealthy) food item leads to higher likelihood of subsequently choosing an unhealthy food. Consistent with H1, sampling the healthy (vs. unhealthy) food led to higher preference for the unhealthy foods from the menu ($P_{\text{healthy-sample}} = 50.60\%$ vs. $P_{\text{unhealthy-sample}} = 34.18\%$; $\chi^2 = 4.47$, $p = 0.035$).

It is possible that the effects of this study might have been influenced by the "healthy = less filling" heuristic (Suher et al., 2016) and the idea that healthy food induces hunger (Finkelstein & Fishbach, 2010). In line with Finkelstein and Fishbach, healthy sampling may activate feelings of hunger, which can lead to increased consumption of not just indulgent but also neutral food items. We rule out this possible alternative explanation in Study 2. Additionally, the sampled items across our studies were small bite-sized pieces to ensure they would not be large enough to influence hunger levels. Next, we examine the effects of sampling with calorie content as the dependent variable.

Study 1b: Field experiment at a food store

Study 1b demonstrated the effects of sampling in a different field setting. Specifically, while Study 1a examined the phenomenon in a restaurant context in the U.S., Study 1b was conducted at a food store at a farmers' market in Europe. Moreover, while Study 1a involved a hypothetical choice as the DV, Study 1b had a consequential DV. Also, in Study 1a, no information was provided about the calorie content of the food items on the menu. In contrast, in Study 1b, each item's calorie information was displayed. Accordingly, Study 1b examined the calorie content per item purchased and the total number of calories purchased. The average calorie content of each item should be higher with healthy (vs. unhealthy) sampling. The total number of calories purchased should also follow a similar pattern of effects.

Method

Study 1b was a field experiment conducted at a food store at a farmers' market in Germany in collaboration with the store management. Typical items sold at the store were different types of bread and a variety of other baked products, along with different types of cakes, fruits, and nuts. A calorie label was placed in front of each item for the duration of the study. The experiment had two manipulated conditions (sampling of bite-sized healthy item vs. unhealthy item).

Customers at the store were randomly given either a bite-sized apple slice (healthy) or a bite-sized cake piece (unhealthy) as a complimentary sample when they arrived at the store. This is a credible manipulation since many food stores frequently give out complimentary food samples (Pinsker, 2014; see also Web Appendix 1). This resulted in 143 customers. Since no survey was administered, we did not collect information on basic demographics like age and gender identification. After the sampling, participants browsed through the store's offerings, made their purchases, and left. Every food item in the store had a calorie information label in front of the item. In the guise of store employees, research assistants kept track of linking each customer's sampling condition with their purchase receipts. The research assistants were blind to the hypotheses or the purpose of the study. Consumers' purchases were unobtrusively recorded through the sales receipts obtained from the store management.

Results and discussion

Consistent with our hypothesis, the average calorie per item purchased was higher for customers who sampled the healthy (vs. unhealthy) sample (that is, bite-sized apple slice vs. cake piece) ($M_{\text{healthy-sample}} = 377.39$ vs. $M_{\text{unhealthy-sample}} = 329.92$; $F(1, 141) = 8.02$, $p < 0.01$, $\eta^2 = 0.05$). The number of items purchased by each customer, while directionally higher for the healthy (vs. unhealthy) sampling, was not statistically significant, as revealed by a Poisson loglinear regression model ($M_{\text{healthy-sample}} = 1.69$ vs. $M_{\text{unhealthy-sample}} = 1.40$; Wald $\chi^2 = 1.80$, $p = 0.18$). Also, customers who sampled the healthy (vs. unhealthy) item purchased a higher amount of total calories ($M_{\text{healthy-sample}} = 638.91$ vs. $M_{\text{unhealthy-sample}} = 461.98$; $F(1, 141) = 4.08$, $p = 0.045$, $\eta^2 = 0.03$).

The results of this study extend the findings of Study 1a by demonstrating the effects of sampling on calorie content. The results reveal that while the number of items purchased was not significantly influenced by the sampling, the average calorie content (and total calories) of the purchased items was higher for the healthy (vs. unhealthy) sampling. Next, Study 2 examines the effects when a control condition (of no food sampling) is included. Study 2 also helps rule out the "healthy = less filling" heuristic (Suher et al., 2016) that can potentially explain the results of both Studies 1a and 1b.

Study 2: Comparison to control condition

This study, conducted in the lab, had three manipulated, between-subjects conditions (sampling healthy food vs. sampling unhealthy food vs. control condition of no sampling).

Method

One hundred and one students from a major US university (51% female; M_{age}: 24) participated in the study for course credit. We do acknowledge the relatively low sample size of this study; the sample size was determined by the number of people who signed up to participate and showed up at the lab to participate during a particular week.

Participants arrived at a waiting area and were brought into a lab by research assistants. After participants were seated, they were given either a bite-sized amount of dried fruit (healthy sampling) or a bite-sized chocolate piece (unhealthy sampling) or no food sample (control condition). All the participants in a particular session were given the same food sample to avoid influences related to the presence of the other type of food. After that, they were asked to undertake a separate task related to indicating their food preference at that moment, whereby they were asked: "Right now, if given a choice between a salad and a grilled cheese sandwich, which one are you more likely to choose?" (1 = definitely salad, 7 = definitely grilled cheese sandwich). The salad and the grilled cheese sandwich represented healthy and unhealthy food options. We also measured hunger by asking: "How hungry are you right now?" (1 = not at all hungry, 7 = very hungry) to examine if hunger influences the results. Three participants did not respond to the hunger question. The sampling involved actual foods, while the preference measure involved a hypothetical choice.

Results

There was an overall main effect of the manipulated condition on preference between salad and grilled cheese sandwich ($F(2, 98) = 3.41$, $p = 0.037$, $\eta^2 = 0.07$). Post-hoc contrasts show that consistent with the effects observed in Study 1a, participants sampling the healthy (vs. unhealthy) food item subsequently chose the unhealthy food option to a greater extent (4.69 vs. 3.34; $F(1, 98) = 5.13$, $p = 0.026$). Also, compared to the control condition, sampling the healthy food led to a subsequent greater preference for the unhealthy food option (4.69 vs. 3.38; $F(1, 98) = 5.0$, $p = 0.028$). There

was no difference between the control condition and the unhealthy food sampling (Means = 3.38 and 3.34; $F(1, 98) = 0.00$; $p = 0.95$).

There was no main effect of sampling on hunger ($F(2, 95) = 0.60$; $p = 0.55$, $\eta^2 = 0.012$). Adding hunger as a covariate did not affect the overall main effect of the manipulated condition on preference between salad and grilled cheese sandwich ($F(2, 94) = 3.71$, $p = 0.028$, $\eta^2 = 0.07$). The results of a linear regression with hunger as the IV and food preference as the DV showed a significant effect (B = 0.29, $p = 0.03$) with the direction of effects being positive (i.e., higher hunger led to a higher degree of unhealthy food preferences). To examine the joint effects of sampling on hunger and the effects of hunger on choice, we ran a PROCESS Model 4 (Hayes, 2017) regression. The IV (sampling) was coded as "0" for healthy sample, "1" for unhealthy sample, and "2" for no sampling.

The results show no significant effects of sampling on hunger (B = 0.2367, SE = 0.2231; $t = 1.06$, $p = 0.29$; CI_{95}: [-0.2062, 0.6795]) but there was a significant effect of hunger on food preference (B = 0.3234, SE = 0.1296; $t = 2.49$, $p = 0.01$; CI_{95}: [0.0660, 0.5807]). There was no indirect effect of sampling on preference; that is, hunger did not mediate the effects of sampling on preference (B = 0.0765, SE = 0.0896, CI_{95}: [-0.0636, 0.2982]). However, as expected, there was a direct effect of sampling on food preference (B = -0.7301, SE = 0.2850; $t = -2.56$, $p = 0.01$; CI_{95}: [-1.2959, -0.1643]).

Discussion

These results again demonstrate that sampling a healthy (vs. unhealthy or no) food item led consumers to subsequently prefer unhealthy options to a greater extent. Unhealthy item (vs. control condition of no item) sampling led to similar preference outcomes, consistent with a moral licensing account. One weakness of Study 2 is the relatively smaller sample size. We addressed this by conducting a higher-powered field experiment (Web Appendix 3).

The findings of this study suggest asymmetric effects of consuming bite-sized healthy versus unhealthy samples. This asymmetric effect of bite-sized sampling of healthy versus unhealthy foods arises because consumers do not usually feel guilty when consuming just a bite-sized unhealthy food since smaller foods are associated with lower calorie levels (Scott et al., 2008).

To further test this claim, we conducted a pilot study (N = 70; M_{age}: 21; females: 39%) with undergraduate students at a US university, which showed that consistent with our expectations, a bite-sized unhealthy sample did not have a significant effect on guilt. Specifically, in this pilot study, participants were given either a pineapple fruit snack (healthy sample) or a bite-sized chocolate piece (unhealthy sample). Guilt was measured by asking participants: "To what extent did you feel guilty after eating this food?" (1 = did not feel guilty at all, 7 = felt very guilty). Sampling the bite-sized chocolate (vs. fruit) sample led to statistically similar outcomes for guilt ($M_{unhealthy\text{-}sample} = 2.94$ vs. $M_{healthy\text{-}sample} = 2.61$; $F(1, 68) = 0.52$, $p = 0.475$, $\eta^2 = 0.008$). Moreover, the guilt mean value for the "unhealthy sample" condition ($M = 2.94$) was significantly below the scale midpoint of 4 ($t(31) = 2.68$, $p = 0.012$).

These findings show that consistent with our expectation, bite-sized unhealthy samples do not lead to significantly higher guilt outcomes. This, in turn, explains the asymmetric effects whereby the "healthy sample" condition differed from the control condition, but the "unhealthy sample" condition did not. Next, we examine how perceived dissimilarity can influence the direction of effects.

Study 3a: Moderating effect of perceived dissimilarity with a consequential food choice

In Studies 1a – 2, the initially sampled items and subsequent options were deliberately chosen to be distinctively different from each other (see Web Appendix 2). In Studies 3a – 3c, we opted for sampled and subsequent food options that are somewhat ambiguous to examine if the variance in perceived dissimilarity can influence the outcome. As predicted by H2, higher perceived dissimilarity would lead to choice outcomes consistent with a moral licensing account while lower perceived dissimilarity (i.e., higher perceived similarity) would lead to choice outcomes consistent with a priming effect.

Method

Study 3a was a preregistered experiment (https://aspredicted.org/f4di9.pdf) conducted with undergraduate students (N = 270; $M_{age} = 20.57$; females: 63%, males: 37%) recruited from the subject pool of a major US university in exchange for course credit. This study tested H2 with a two-factor experiment with the first factor (sampled food: healthy vs. unhealthy) being between-subjects and the second factor (perceived similarity/dissimilarity between sampled food and subsequent options) being measured. For the first factor, participants sampled either freeze-dried strawberry crisps (healthy food sample) or Rolo chocolate (unhealthy food sample). See Web Appendix 2 for the post-test about the two foods being rated similarly as being samples and their differential ratings on healthy-unhealthy perceptions. The second factor, perceived similarity, was measured by asking: "Looking at the options you just chose from, how dissimilar/similar are

these to the foods you were asked to sample?" (1 = very dissimilar, 7 = very similar). We reverse coded this item for the analysis to be in line with the other studies, such that higher numbers represent higher dissimilarity. The dependent variable of food choice was consequential whereby participants took their chosen food item (granola bar [healthy choice] or cookie & caramel bar [unhealthy choice]) with them. See Web Appendix 2 for the post-test of perceived unhealthiness of the items and Web Appendix 5 for images of the items.

Results and discussion

We conducted a floodlight analysis using a bootstrapped samples (5,000) procedure with PROCESS Model 1 (Hayes, 2017). The IV was sampling (healthy sample coded as 1 and unhealthy sample coded as 2), moderator being perceived dissimilarity (1 = very similar, 7 = very dissimilar), and DV being subsequent choice (coded as 1 = healthy, 2 = unhealthy). There was a significant interaction effect between the sampling and perceived dissimilarity on subsequent choice (B = -1.2292, SE = 0.1847, CI_{95} = [-1.4913, -0.7671]; Z = -6.11, $p < 0.001$). Figure 1 plots the Johnson-Neyman (JN) significance region for the floodlight analysis. There are two JN points of significance, one at 4.0314 (with 43.33% of the participants at this value and below) and another at 5.1888 (with 37.41% of the participants at this value and above). As can be seen from the shaded areas of Fig. 1, at low levels of dissimilarity (i.e., high similarity), the effects are consistent with a priming account whereby sampling a healthy (unhealthy) food sample leads to greater preference for healthy (unhealthy) foods. In contrast, at high levels of dissimilarity, the effects are consistent with a moral licensing account whereby sampling a healthy (unhealthy) food sample leads to greater preference of unhealthy (healthy) foods. The results of this study provide support in favor of H2. Next, Study 3b replicates these findings.

Study 3b: Replication of Study 3a

Study 3b had the exact same design, procedure, and stimuli as Study 3a but was conducted at another US university (N = 106; M_{age} = 20.65; females: 49.1%, males: 50%, non-binary/other: 0.9%) where volunteering students participated for extra credit. Similar to Study 3a, this study also involved consequential choices whereby participants could take

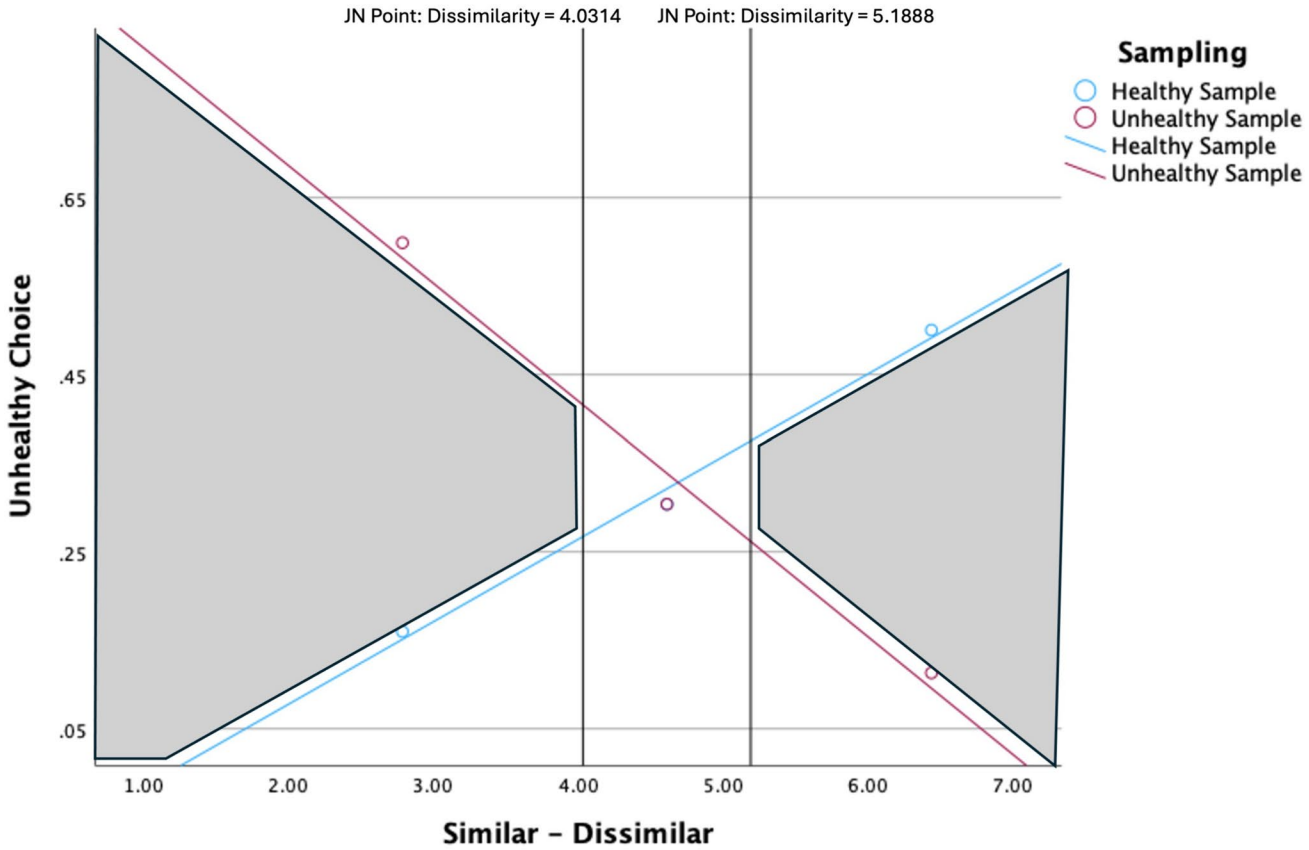

Fig. 1 Johnson-Neyman Analysis of Choice as a Function of Sampling and Perceived Dissimilarity

their chosen food item (e.g., granola bar [healthy choice] or cookie & caramel bar [unhealthy choice]) with them.

Results and discussion

We conducted a floodlight analysis using a bootstrapped samples (5,000) procedure with PROCESS Model 1 (Hayes, 2017). The IV was sampling (healthy sample coded as 1 and unhealthy sample coded as 2), moderator being perceived dissimilarity (1 = very similar, 7 = very dissimilar), and DV being subsequent choice (coded as 1 = healthy, 2 = unhealthy). There was a significant interaction effect between the sampling and perceived dissimilarity on subsequent choice (B = -2.1994, SE = 0.6796, CI_{95} = [-3.5314, -0.8675]; Z = -3.24, p = 0.001). Figure 1 plots the Johnson-Neyman (JN) significance region for the floodlight analysis. There are two JN points of significance, one at 3.4547 (with 27.36% of the participants at this value and below) and another at 5.0199 (with 32.08% of the participants at this value and above). As can be seen from the shaded areas of Fig. 2, at low levels of dissimilarity (i.e., high similarity), the effects are consistent with a priming account whereby sampling a healthy (unhealthy) food sample leads to greater preference for healthy (unhealthy) foods. In contrast, at high levels of dissimilarity, the effects are consistent with a moral licensing account whereby sampling a healthy (unhealthy) food sample leads to greater preference for unhealthy (healthy) foods. The results of this study provide support in favor of H2. Next, Study 3c replicates these findings involving a different set of food options.

Study 3c: Replication of Study 3a with hypothetical food choice

This study had the same design and food sample manipulation as Study 3a. That is, participants sampled either freeze-dried strawberry crisps (healthy food sample) or Rolo chocolate (unhealthy food sample). The DV for the choice outcome was a chocolate chip cookie versus a blueberry granola bar; also, while Studies 3a and 3b involved consequential food choices, Study 3c involved a hypothetical food choice. See Web Appendix 2 for a post-test on healthfulness perceptions of all items. Perceived dissimilarity was measured in a similar manner as in Study 3a. Participants were

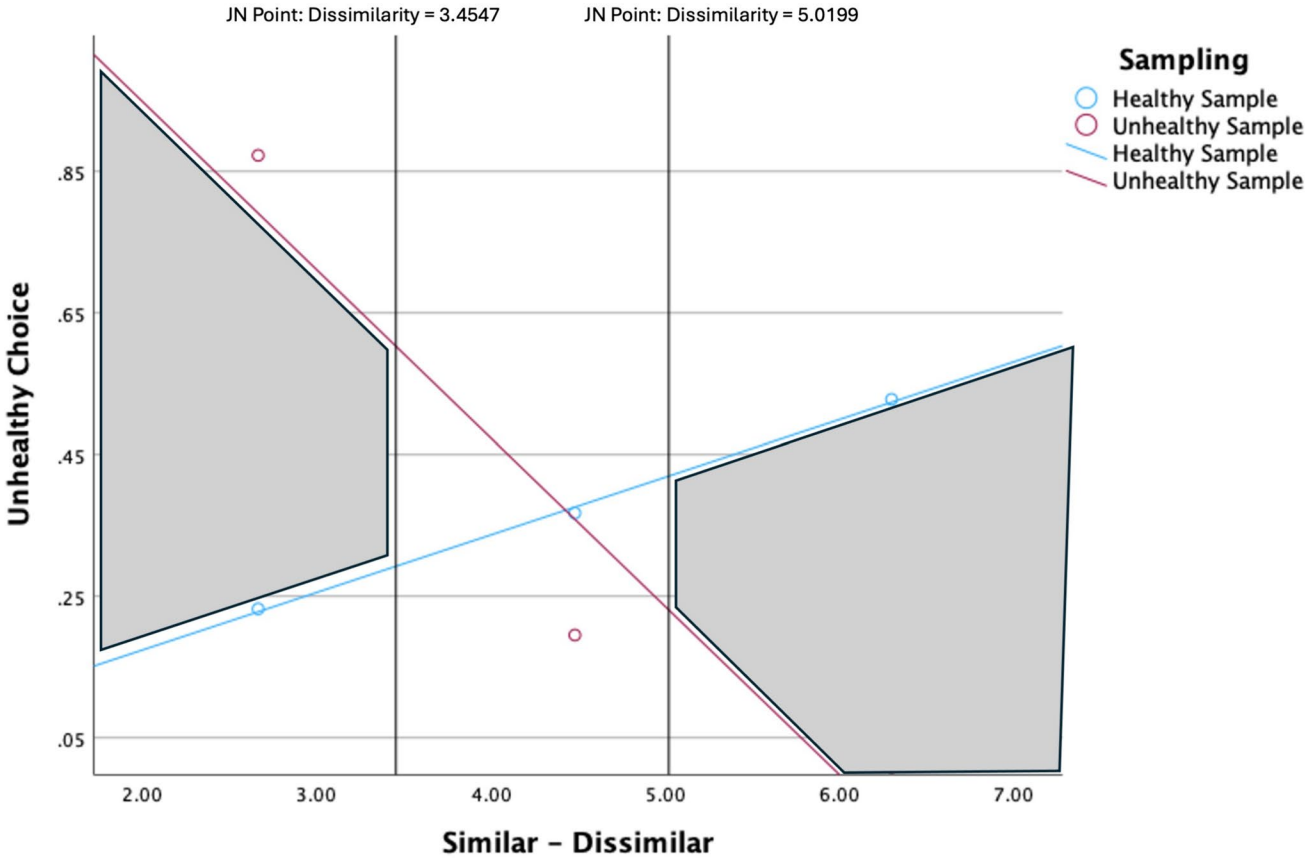

Fig. 2 Johnson-Neyman Analysis of Choice as a Function of Sampling and Perceived Dissimilarity

university students (N = 156; M_{age} = 20.58; females: 39.7%, males: 60.3%).

Results and discussion

To test the moderating effect of the continuous variable of perceived dissimilarity, we conducted a floodlight analysis using a bootstrapped samples (5,000) procedure with PROCESS Model 1 (Hayes, 2017). The IV was sampling (healthy sample coded as 1 and unhealthy sample coded as 2), moderator being perceived dissimilarity (1 = very similar, 7 = very dissimilar), and DV being subsequent choice (coded as 1 = healthy, 2 = unhealthy). There was a significant interaction effect between the sampling and perceived dissimilarity on subsequent choice (B = —1.0775, SE = 0.2596, CI_{95} = [-1.5863, -0.5687]; $Z = 4.15$, $p < 0.001$). Figure 3 plots the Johnson-Neyman (JN) significance region for the floodlight analysis. There are two JN points of significance, one at 4.1610 (with 41.03% of the participants at this value and below) and another at 5.7008 (with 39.10% of the participants at this value and above). As can be seen from the shaded areas of Fig. 2, at low levels of dissimilarity (i.e., high similarity), the effects are consistent with a priming account whereby sampling a healthy (unhealthy) food sample leads to greater preference for healthy (unhealthy) foods. In contrast, at high levels of dissimilarity, the effects are consistent with a moral licensing account whereby sampling a healthy (unhealthy) food sample leads to greater preference for unhealthy (healthy) foods. Study 3c replicates the findings of Studies 3a-3b and again provides support in favor of H2. See Web Appendix 3 and Web Appendix 4 for replication studies conducted at a restaurant, examining the main effect and moderating effects of dissimilarity.

General discussion

Eight experiments (six reported in the main text and two in the Web Appendix), with four conducted in field settings, demonstrate interesting results for the effects of sampling a healthy versus unhealthy food item on subsequent choices and total calorie purchases. When perceived dissimilarity between the sampled and subsequent options is relatively high, the effects are consistent with a moral licensing account whereby sampling a healthy (vs. an unhealthy) item led to greater subsequent choice of unhealthy items.

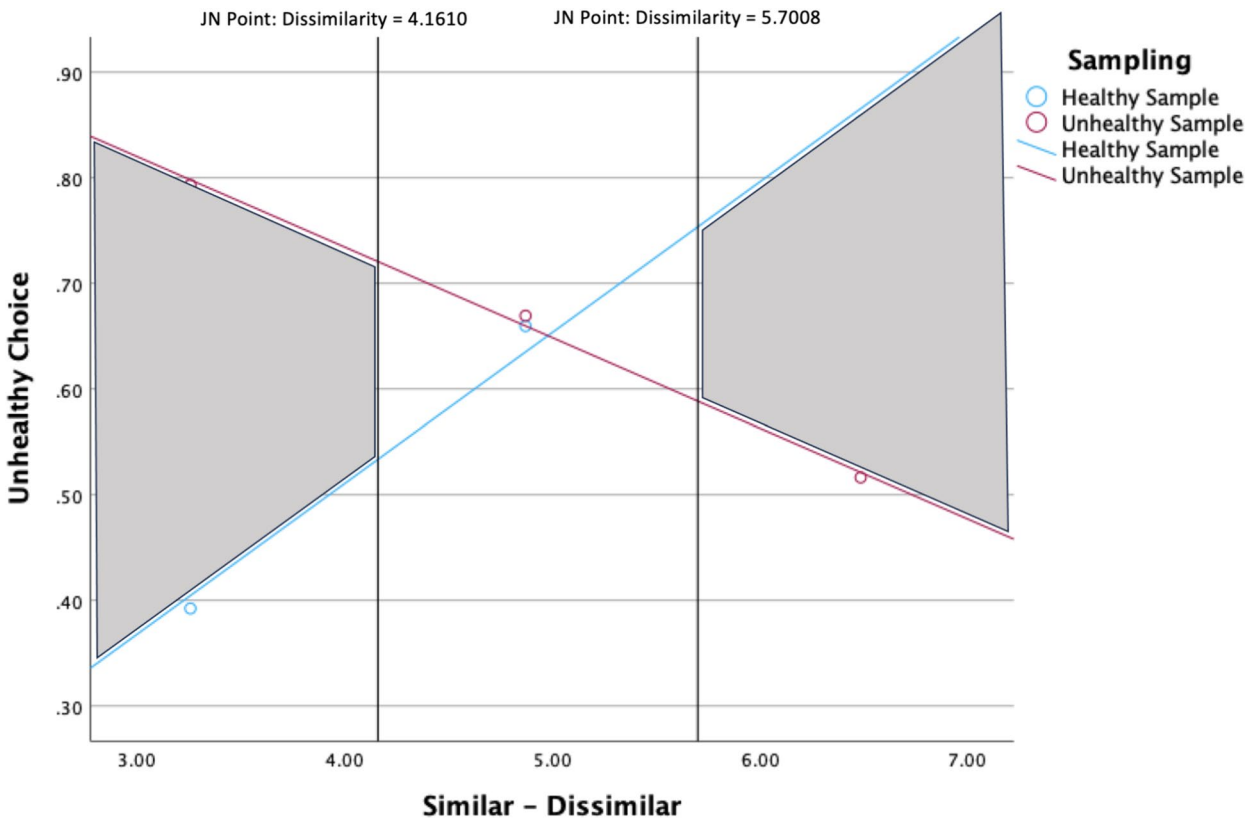

Fig. 3 Johnson-Neyman Analysis of Choice as a Function of Sampling and Perceived Dissimilarity, Study 3b. Notes: Gray areas indicate Johnson-Neyman regions of significance

In contrast, when the perceived dissimilarity is low (i.e., perceived similarity is high), the outcomes are along the lines of priming effects whereby sampling a healthy (vs. an unhealthy) item led to greater subsequent choice of healthy items.

Conceptually, these findings contribute to both the moral licensing and the priming effects literature streams. Our research also contributes to prior research on sampling. Specifically, while prior research on sampling has examined the effects of sampling on evaluation/choices related to the sampled product (e.g., Biswas et al., 2010, 2014; Nowlis & Shiv, 2005; Shiv & Nowlis, 2004), the present research examines the effects of sampling on subsequent choices of *other* products. To the best of our knowledge, this is the first research to examine how sampling healthy versus unhealthy items can influence subsequent choices of healthy and unhealthy options along with the moderating effects of perceived dissimilarity across the food items. Hence, our research findings have implications for consumer health and wellbeing, especially given worldwide concerns related to unhealthy eating.

There is a rich literature in econometrics and marketing science on cross-price elasticities (Auer & Papies, 2020) and cross-brand spillover effects (Sanchez et al., 2020). The findings of this research add to our understanding of cross-product influences through sampling effects. From a cross-product elasticity perspective, sampling of a healthy food has higher elasticity in terms of the demand for unhealthy foods than sampling of unhealthy foods has on demand for healthy foods when the items are perceived as dissimilar. Such a finding has both theoretical and practical relevance for cross-product spillover effects.

We also add to the literature on variety seeking, as we demonstrate that the downstream effects of sampling a bite-sized item differ based on similarity perceptions of sampled and chosen items. While studies have demonstrated the "healthy = less filling" heuristic and the idea that healthy food induces hunger (Finkelstein & Fishbach, 2010; Suher et al., 2016), this was not at play in our studies (see e.g., Study 2).

The results of our studies highlight that while sampling a healthy item at a store, restaurant, or food court might seem like a mindless activity, there can be downstream consequences in terms of types of foods subsequently purchased. While it seems counterintuitive and even controversial, our results suggest that having healthy (vs. unhealthy) samples at stores and restaurants might actually backfire for consumer wellbeing in terms of unhealthy food and calorie purchases, if the sampled food and subsequent options are perceived as being highly dissimilar. In contrast, it would be prudent to sample healthy foods if there is relatively high similarity between the sampled item and the subsequent purchase options.

Implications for managers and customers

As outlined in the introduction, companies spend over a billion dollars on free food samples in the U.S. alone. Examining how sampled foods influence overall sales is important, given the high amount of money spent on food samples. Giving out free samples has become very popular mainly because many retail outlets have often noted better returns through providing samples than through traditional advertising (Biswas et al., 2014). As a result, both managers and researchers have focused on sales and evaluation of the sampled item. However, products do not exist in isolation at stores/restaurants, and unintended spillover effects of sampling one product on sales of other products are important to consider.

In essence, while research reported in academic journals and the popular press highlight how free samples influence sales of the *sampled* items, little is known about how such sampling might affect subsequent purchases of *other* items in the store or restaurant. For example, the findings of our research suggest that a retailer or a restaurant need to be cognizant of how the sampled food items might influence sales of other items. Related to this, the degree of similarity/dissimilarity between the sampled item and the available alternatives can influence the pattern of effects.

These also raise ethical and moral concerns since retail stores and restaurants can unintentionally influence consumers to opt for overall unhealthy purchases by offering a bite-sized healthy item at the point of entry to the store especially if this complimentary item is perceived as differing from the mix of subsequent options offered at the store. Consumers need to know how initial food sampling might influence their overall purchases. Therefore, at a food store or food court, consumers need to keep in mind that having the healthy bite-sized option might give them the feeling of virtuousness to subsequently indulge if these different activities are perceived as being dissimilar. Additional research is needed to examine how perceived mental accounts or episodes across different activities might influence the effects observed in our studies.

Limitations and future research directions

We focused on managerially relevant findings. Additional studies, in the consumer psychology domain, need to examine the underlying process in greater depth especially since there are other factors that can explain our observed main effects. As mentioned earlier, one of these is the "healthy = less filling" heuristic and that healthy food induces hunger (Finkelstein & Fishbach, 2010; Suher et al., 2016) and another is related to variety-seeking behavior (Ratner & Kahn, 2002), which is addressed in Study 1a. It is also possible that receiving something tasty to eat can

increase positive affect, which can promote an abstract construal, which can subsequently shift attention to desirability related attributes (Labroo & Patrick, 2009; Liberman et al., 2007). Clearly, additional work is needed to explore these in greater detail.

Across all our studies, participants received only one item (either healthy or unhealthy) to sample. What might be the effects when participants get to sample a mix of healthy and unhealthy items? Would the combination of healthy and unhealthy sampled items "cancel" the virtue and the vice (e.g., Chernev & Gal, 2010) and the subsequent choice outcome be similar to a control condition of no sampling? Further research is needed to examine this in greater depth.

We did not examine any personality traits or behavioral traits that might moderate the observed effects. For instance, how might the observed effects be different for health-conscious consumers versus those who are not? While intuitively, health-conscious consumers might be more likely to opt for the subsequent healthy options, it may be the case that being more health-conscious or a constrained eater triggers stronger feelings of virtuousness and, hence, a greater likelihood of subsequent indulgence. This is a potentially interesting future research topic area.

Additionally, future research is needed to see if our findings extend beyond the food domain. We specifically focus on food due to the practical angle whereby retail outlets hand out complimentary foods. Our research shows that bite-sized sampling leads to subsequent choices more aligned with moral licensing (priming effects) when the consumer perceives higher dissimilarity (similarity) between the sampling episodes. This may extend into other domains, such as interpersonal relationships (dissimilarity between individuals) or prosocial behaviors (dissimilarity between nonprofit organizations). That is, after giving a small amount to a charity, would a person be more likely to give more to a similar charity, but less to a dissimilar cause? Would flirting (or choosing not to flirt) with a person dissimilar from (or similar to) a partner have consequences for how that person interacts with their spouse? Future research could extend our work into other areas where different activities may seem similar or dissimilar.

In our research, the sampled items were bite-sized, again in line with actual managerial practices. However, would varying the quantity of sampled food influence subsequent choices differently? For example, would the subsequent food choices differ if the initially sampled food is small versus large in quantity? Further, what might be the effects if the sampled items are of the same healthiness levels but differ on some other dimensions, such as taste or texture? For example, would greater effort expended in chewing a harder (vs. softer) food lead to different subsequent choices for healthy versus unhealthy options? Similarly, would sampling something less tasty provide the feelings of virtuousness to indulge subsequently? Again, these questions await further research.

In closing, the findings of our research might potentially help explain a general paradox being reported in the U.S. Specifically, Brown et al. (2016) noted that while the rates of physical exercise activities of Americans have gone up significantly between 1988 and 2006 (with the increase being at 120% for females and 47% for males), surprisingly, the obesity rate has also gone up (for both females and males) during this period. While we do not examine the effects of physical exercises, a case can be made that exercising (similar to sampling a healthy item) provides a feeling of virtuousness, which in turn provides the moral license to subsequently undertake self-rewarding indulgence. This is especially relevant since physical exercise and eating are perceived to be dissimilar tasks. In other words, a little "good thing" can backfire in terms of subsequent indulgent activities on a larger scale, thereby not only neutralizing the initial good deed but also going beyond in terms of adverse outcomes. That might explain the parallel increase in physical activity/exercise levels and calorie consumption for Americans over the last two decades, and increased obesity levels (Brown et al., 2016; Gholipour, 2013). Clearly, additional research is needed to examine this in greater depth. We hope our research will provide the impetus for additional work in these and related topic domains.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11747-024-01047-4.

Declarations

Conflict of interest The authors have no conflict of interest.

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